

area of low pressure, and was central over west South Dakota the evening of the 22d, whence it advanced to east Manitoba by the evening of the 23d, and passed thence north of the region of observation, its course being influenced by high area IV, which occupied the Lake region and Ohio Valley on the 23d and 24th. The passage of this storm was unattended by general rain, save in the Valley of the Red River of the North. The lowest pressure observed was 29.46, at Bismarck, N. Dak., the morning of the 23d. Local storms with exceptionally heavy rainfall occurred in northwest Iowa on the 23d and 24th, and the wind velocity exceeded 40 miles per hour in North and South Dakota on the 23d.

X.—Was apparently an off-shoot of the southern plateau area of low pressure, and the morning of the 26th was central over east Wyoming, whence it passed to Manitoba by the 27th,

and thence slowly east-southeast to the region north of Lake Huron by the evening of the 29th, after which it apparently dissipated. The lowest pressure noted during the passage of this low area was 29.36, at Minnedosa, Man., the evening of the 27th. Rain fell in the middle Missouri valley on the 26th, from Kansas to the Lake region on the 27th, in the Lake region, the middle and lower Ohio valleys, and the extreme northwest on the 28th, and generally in the Lake region, the middle Ohio valley, Tennessee, and the east Gulf states on the 29th. Local storms occurred in Colorado on the 25th, heavy rains in Nebraska and Kansas on the 26th, severe local storms with exceptionally heavy rain from Kansas to Wisconsin on the 27th, severe local storms from Kansas over the middle Ohio valley on the 28th, and in the states of the middle Mississippi valley on the 29th.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.			Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.											
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.				Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.		
High areas.		°	°	°	°	Days.	Miles.			Inch.			°							
I.....	4	48	97	39	73	5.5	10		Fort Sully, S. Dak.....	.46	3	Dubuque, Iowa.....	24	4	Chicago, Ill.....	ne.	35	5		
II.....	10	43	105	38	77	4.0	19		Salt Lake City, Utah.....	.48	0	Saint Vincent, Minn.....	15	9	Sault de Ste. Marie, Mich.	nw.	23	11		
III.....	15	47	106	51	97	1.5	21		Port Arthur, Ont.....	.30	16	Duluth, Minn.....	22	16	Pueblo, Colo.....	n.	36	16		
IV.....	23	42	88	37	83	3.0	12		White River, Ont.....	.30	23	do.....	24	23	Kitty Hawk, N. C.....	ne.	34	24		
V.....	25	50	97	48	82	2.0	15		Winnipeg, Man.....	.32	25	Portland, Me.....	19	25	Port Huron, Mich.....	ne.	34	26		
VI.....	29	48	126	35	97	2.0	39		Minnedosa, Man.....	.32	25	Santa Fé, N. Mex.....	12	29	Rapid City, S. Dak.....	nw.	36	29		
Mean.....							3.0	19		.37			19				34			
Low areas.										Fall.			Rise.							
I.....	1	38	109	42	90	2.5	21		Cheyenne, Wyo.....	.26	1	Milwaukee, Wis.....	15	3	Saint Louis, Mo.....	w.	59	3		
II.....	1	48	77	51	62	1.0	31		Father Point, Quebec.....	.34	2	Chatham, N. B.....	10	1	Montreal, Quebec.....	sw.	32	3		
III.....	5	35	100	37	91	1.5	17		Saint Louis, Mo.....	.18	5	Kansas City, Mo.....	12	6	Chicago, Ill.....	e.	44	6		
IV.....	8	42	111	49	70	3.0	31		Fort McKinney, Wyo.....	.38	8	Duluth, Minn.....	18	8	Huron, S. Dak.....	se.	56	9		
V.....	12	45	106	48	60	4.0	29		Father Point, Quebec.....	.26	16	Eastport, Me.....	18	16	Huron, S. Dak.....	se.	56	13		
VI.....	16	38	100	41	86	3.5	11		Saint Louis, Mo.....	.16	17	Sioux City, Iowa.....	15	16	Cairo, Ill.....	sw.	42	16		
VII.....	17	52	114	44	66	6.5	15		Calgary, N. W. T.....	.48	17	Olympia, Wash.....	16	16	Pensacola, Fla.....	sw.	42	17		
VIII.....	19	33	101	40	87	1.5	25		Abilene, Tex.....	.28	18	Kansas City, Mo.....	10	20	Springfield, Mo.....	nw.	38	20		
IX.....	22	45	103	52	97	1.0	25		Denver, Colo.....	.34	22	Cheyenne, Wyo.....	23	22	Bismarck, N. Dak.....	se.	48	23		
X.....	26	45	104	48	83	3.5	18		Saint Vincent, Minn.....	.40	26	Omaha, Nebr.....	14	27	Sioux City, Iowa.....	se.	52	26		
Mean.....							2.8	22		.31			15				51			

NORTH ATLANTIC STORMS FOR JUNE, 1891 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the storms that appeared over the west part of the north Atlantic Ocean during June, 1891, are shown on Chart I. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Severe storms are unusual in the middle latitudes of the north Atlantic Ocean in June, and those of tropical or sub-tropical origin generally recurve far to the eastward of the American coast and seldom acquire destructive strength. The storms of the current month about corresponded in number and character with those previously traced for June, and no storms appeared in the vicinity of the West Indies.

On the 1st a storm of small energy was central between Bermuda and the Grand Banks, whence it advanced to the southwest edge of the Grand Banks by the 2d, recurved to south of Nova Scotia by the 3d, moved southeast to about the 42d parallel by the 4th, thence to the east edge of the Grand Banks by the 5th, and disappeared north of the region of observation by the 6th, the lowest pressure, about 29.60 (752), being noted on the 5th and 6th. From the 6th to the 11th the pressure remained high along the Atlantic coast. On the 1st a storm was central west of the British Isles, with pressure about 29.40 (747) and fresh gales. On the 2d a storm appeared central northeast of the Azores, with pressure below 29.40

(747), whence it passed to southwest of Ireland by the 3d; during the 4th and 5th this storm remained central west and southwest of Ireland, and by the 7th had advanced over the Bay of Biscay. A second storm was central southwest of Ireland on the 9th, whence it apparently passed east over the Bay of Biscay. Following the passage of these storms high pressure continued over and near the British Isles during the second decade of the month.

On the 9th a storm was central east of the Grand Banks, whence it passed northward and disappeared north of the region of observation after the 10th. This storm was attended by the lowest pressure noted for the month, the barometer falling to about 29.00 (736) on the 10th, when the storm was central northeast of the Grand Banks. On the 12th a storm which was the continuation of low area IV was central on the west coast of the Gulf of Saint Lawrence; it passed south of Newfoundland during the 13th and 14th, and thence moved northeastward and disappeared north of the region of observation after the 15th. On the 17th a storm which was a continuation of low area V was central south of Newfoundland, whence it passed northeast and disappeared north of the region of observation. On the night of the 17th a storm of small energy apparently developed near Chesapeake Bay, whence it passed east-northeast to east of the Grand Banks by the 20th, and thence northeastward beyond the region of observation. Low pressure continued over mid-ocean until the 24th, on which

date the pressure was also low over the Bay of Biscay. By the 25th these storms had apparently united west of Ireland, where the pressure continued low, ranging from 29.40 (747) to 29.60 (752), until the close of the month. On the 25th a storm (low area VII, which had advanced from the north Pacific coast) was central south of Nova Scotia, where it remained nearly stationary, with pressure ranging from 29.30 (744) to 29.60 (752), until the close of the month.

OCEAN ICE IN JUNE.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for June during the last nine years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
June, 1883.....	40 28	51 45	June, 1883.....	48 14	42 43
June, 1884.....	40 42	47 49	June, 1884.....	44 00	45 23
June, 1885.....	39 38	48 12	June, 1885.....	45 14	41 12
June, 1886.....	40 30	53 00	June, 1886.....	49 15	40 00
June, 1887.....	40 40	48 34	June, 1887.....	43 22	39 19
June, 1888.....	43 38	43 24	June, 1888.....	43 38	43 24
June, 1889.....	42 54	49 54	June, 1889.....	46 57	40 29
June, 1890.....	40 01	52 00	June, 1890.....	46 08	37 07
June, 1891.....	40 15	50 24	June, 1891.....	44 15	43 47
Mean	40 58	49 27	Mean	45 41	41 29

*On the 10th a small block of ice was reported in N. 46° 28', W. 28° 34'.

The above table shows that for June, 1891, ice was reported about three-fourths degree north and more than two degrees west of the average southern and eastern limits of ice for the corresponding month of the last eight years. The southernmost

ice reported was an iceberg on the 14th, and the easternmost ice was an iceberg on the 21st, in the positions given. Immense fields of ice and numerous icebergs are commonly encountered over and near the Grand Banks in June, and in the current month the aggregate quantity about equaled the average for June of preceding years. The German S. S. "Cremon" is reported as having made the passage through the Straits of Belle Isle, no date given. This was the first passage through the Straits of Belle Isle this season. No field ice was seen, but there were a number of icebergs at the entrance of the Straits, and some on the Labrador coast, but none on the Newfoundland side. On the 15th the passage of the Arctic S. S. "Kite" was blocked by pack ice at Green Island, Straits of Belle Isle. The limits of the region in which icebergs and field ice were reported for June, 1891, are shown on Chart I by ruled shading.

FOG IN JUNE.

June is one of the months of greatest fog frequency near the Banks of Newfoundland.

The limits of fog-belts west of the 40th meridian in June, 1891, as determined from reports of shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 12 dates; between the 55th and 65th meridians on 9 dates; and west of the 65th meridian on 4 dates. Compared with the corresponding month of the last 3 years the dates of occurrence of fog near the Grand Banks numbered 7 less than the average; between the 55th and 65th meridians 6 less than the average; and west of the 65th meridian 10 less than the average. The fog noted by shipmasters and that reported by Signal Service observers on the New England and middle Atlantic coasts generally occurred with the advance from the westward of general storms.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for June, 1891, is exhibited on Chart II by dotted isotherms. In the table of Signal Service data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the average for the respective districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature was highest in the lower Rio Grande valley, where it was above 85, and the mean readings were above 80 in Florida, except on the east coast, over the south part of the Gulf States, and in adjoining parts of west Arizona and southeast California. The mean temperature was lowest at elevated stations in central Colorado, where it was below 45, and the mean values were below 55 in Nova Scotia, along the west coast of the Gulf of Saint Lawrence, in the lower Saint Lawrence valley, northeast Minnesota, at stations in the British Possessions north of Montana, in extreme northwest Washington, and from west Montana southward over northeast Nevada.

The mean temperature was above the normal east of the Mississippi River, except in New England, central Virginia, south Florida, and along the southwest coast of Lake Michigan. It was also above the normal in the west Gulf states, except at Galveston, Tex. In districts lying west of the Mississippi River and the west Gulf states the mean temperature was below the normal, except at San Francisco, Cal. The greatest departure above the normal temperature occurred within an area extending from the east Gulf states over west

Michigan, where it was more than 2, and the most marked departure below the normal temperature was noted within an area extending from the upper Missouri valley over the middle plateau region, where it was more than 4.

From the 15th to 17th unusually warm weather for the season prevailed over New England and the middle Atlantic states, the temperature ranging 10 to 20 above the normal. In New England and New York the temperature was higher than previously reported during the second decade of June. On the 16th the maximum temperature was the highest ever reported for June at the following-named stations: Portland, Me., 94, 4 above; Boston, Mass., 96, 3 above; Northfield, Vt., 90, 5 above; Albany, N. Y., 96, 6 above; New York City, 94, 3 above; Philadelphia, Pa., 94, the same.

The seasonal temperature, January to June, inclusive, averaged about as follows: in the south Atlantic and east Gulf states, the Rio Grande and Missouri valleys, and along the north and south Pacific coasts the temperature was about normal; in the extreme northwest it was about 3 in excess; in New England and the Lake region about 2 in excess; and in the middle Atlantic states, the Ohio Valley and Tennessee, the upper Mississippi valley, and over the northern plateau region about 1 in excess. Over the southern and middle plateau regions the mean temperature for this period was about 3 deficient; at Key West, Fla., and on the northeast and middle-eastern slopes of the Rocky Mountains about 2 deficient; and in the west Gulf states, on the southeast slope of the Rocky Mountains, and along the middle Pacific coast about 1 deficient.

At the following-named stations the mean temperature for the current month was the highest ever reported for June: Grand Coteau, La., 82, 2.5 above the normal, and 0.3 above 1885; Palestine, Tex., 79.9, 1.4 above the normal, and 0.4 above 1883; Rio Grande City, Tex., 86.8, 2.0 above the normal, and